

APPENDIX C

METEOROLOGICAL ANALYSIS

June 27, 2008

The added emissions from an unprecedented number of lightning-generated wildfires in northern and central California caused an exceedance of the 1-hour federal ozone standard at Folsom on June 23, 2008 (refer to discussion of Episode 1). Over the next several days, the wildfires continued to burn. Although wildfire emissions continued to cause elevated ozone concentrations during this time period, concentrations did not exceed the standard, because increased dispersion served to dilute the added emissions burden. However, as more stable conditions settled over the area, the continuing wildfire emissions that were transported into the Sacramento Valley, along with a substantial amount of wildfire-related ozone carried over from the previous day, resulted in an exceedance of the 1-hour standard at the Folsom site on June 27. Although wildfire emissions can be layered throughout the atmosphere, this analysis focuses on emissions in the mixed layer because emissions in this layer impact ground level ozone concentrations. In this document the mixed layer is considered that portion of the lower atmosphere where temperature decreases with height from the ground to the base of the lowest inversion layer.

Analysis

Hundreds of wildfires started by lightning strikes during the June 20-21, 2008, storm system continued to burn and grow in size. By June 27, many of the fires that ringed the Sacramento Valley were more than 300 acres in size, and a substantial number were more than 10,000 acres in size. Overall, nearly 200 fires, totaling tens of thousands of acres, had burned in and around the Sacramento Valley (see Figure 1 and Table 1), and emissions from the numerous wildfires continued to drift into the Sacramento Valley, building up and impacting ambient ozone concentrations.

The Day before the Exceedance: Meteorological conditions on the day preceding the June 27 exceedance were similar to those preceding the June 23 exceedance. As wildfires burned in the Coast Range Mountains, flow from the northwest transported emissions from these fires to the San Francisco Bay Area (Bay Area; see Figures 2 through 5). During the daylight hours on June 26, the prevailing southwest surface winds carried these fire-related emissions from the Bay Area into the southern Sacramento Valley (see Figures 6 and 7). The mid-day NASA satellite image shows a relatively thick layer of smoke from the surrounding fires covering the northern portion of the Bay Area and southern portion of the Sacramento Valley (refer to Figure 2).

The build-up of smoke throughout the southern Sacramento Valley and its presence at ground level is confirmed by airport visibility observations. Figures 3

through 5 show the reduction in visibility from early morning to late afternoon. During the early morning hours (0300-0400 PST), there was some reduction in visibility in the Bay Area (7 to 10 miles), with more substantial reductions in the southern Sacramento Valley (4 to 6 miles). These were accompanied by reports of smoke and haze (refer to Figure 3). Later in the morning (0900-1000 PST), wildfire emissions started to build-up in the areas surrounding Folsom, and visibilities in the foothills of the Sierra Nevada were as low as 1.5 miles (refer to Figure 4). By 1500 PST, wildfire emissions had been transported and concentrated in the southern Sacramento Valley (refer to Figure 5). Sites in the Folsom area reported visibilities in the range of 1.5 to 3 miles, and smoke was observed in the air. Although the wildfire impact did not cause an exceedance on June 26, the associated wildfire-generated pollutants and emissions persisted into the next day, resulting in a very high level of ozone carryover at Folsom.

The Day of the Exceedance: Several factors contributed to the June 27 ozone exceedance at Folsom. First, there was a very high level of ozone carried over from the previous day. The low mixing height and eddy circulation pattern during the early morning hours kept emissions carried over from the previous day trapped near the ground in the southern Sacramento Valley. Ozone concentrations within this air mass were about one-third the level of the federal 1-hour standard and about three times higher than normal (see Figure 8). This high starting level was added to during the day of June 27.

Second, the wind direction was optimal for transporting additional emissions from the fire areas to the southern Sacramento Valley. During the very early morning hours of June 27, surface air movement in the southern Sacramento Valley was controlled by the typical downslope drainage flow. Drainage flow from the northeast carried emissions from wildfires burning in the Sierra Nevada Mountains (see Table 2). During this same time period, drainage flow from the west-southwest carried emissions from fires burning in the Coast Range Mountains (see Table 3). Emissions from both directions were transported into the southern Sacramento Valley.

In addition to the drainage flow, there was sea breeze flow from the Bay Area through the Carquinez Strait (see Figure 9). These light winds were driven by a weak onshore pressure gradient. The pressure gradient is the difference in atmospheric pressure between two areas, and it provides a force which moves air from higher to lower pressure. At 0400 PST, the surface pressure difference was 1.6 millibars between San Francisco (KSFO; higher pressure area) and Sacramento (KSAC; lower pressure area). The sea breeze winds decreased as they reached the southern Sacramento Valley, setting up a localized eddy circulation in the southwestern portion of the Valley. Emissions from wildfires burning in the Coast Range Mountains were transported into the Bay Area (see Figures 10 through 14). The sea breeze then carried these fire-related emissions from the Bay Area into the southern Sacramento Valley. These emissions, along with drainage flow emissions, were caught-up in the localized eddy circulation pattern during the overnight hours, trapping them in the southern portion of the

Sacramento Valley (refer to Figure 9). Furthermore, because the overnight height of the mixed layer was low, the wildfire emissions were confined to a relatively shallow layer and were concentrated near the surface (see Figure 15). The pressure gradient (4.9 millibars) between Reno (KRNO; higher pressure area) and Sacramento (KSAC; lower pressure area) at 0400 PST helped keep emissions in the Valley.

By late morning and into the afternoon, emissions from the various areas mixed and spread throughout the Sacramento Valley. Emissions from fires burning in the Coast Range Mountains continued to be transported into the Bay Area (refer to Figures 10 through 14). These emissions in the Bay Area then continued to drift into the southern portion of the Sacramento Valley as the afternoon onshore pressure gradient strengthened to 3.0 millibars between San Francisco (KSFO; higher pressure area) and Sacramento (KSAC; lower pressure area), sustaining the moderate onshore sea breeze (refer to Figures 16 and 17). This was accompanied by a continuing eddy circulation pattern in the southwestern portion of the Valley and a positive surface pressure gradient between Reno (KRNO; higher pressure area) and Sacramento (KSAC; lower pressure area), which prevented emissions from being blown out of the Valley. As shown in the satellite images (see Figures 13 and 14), smoke from fires in the adjacent mountains shrouded the entire Sacramento Valley. Later in the afternoon, as the eddy circulation pattern weakened, some of the emissions that had been trapped in the eddy dispersed into the sea breeze flow within the southern Sacramento Valley, adding to the emissions burden at Folsom.

Third, the height of the mixed layer increased as the day progressed. This allowed wildfire emissions from a larger volume of air to be mixed down to the surface, where they could impact ozone concentrations. Over the course of the day, the height of the mixed layer, measured at Elk Grove, increased from approximately 150 meters in the morning to more than 500 meters by 1500 PST (refer to Figure 15). The increase in the height of the mixed layer allowed additional wildfire emissions to reach the ground. These emissions combined with those transported closer to the surface and compounded the severity of the wildfire impact. As the height of the mixed layer increased over several hours, ozone concentrations also increased, reaching a maximum at 1500 PST. Although the relatively low height of the mixed layer on June 27 helped to trap wildfire emissions, the surrogate day assessment indicates conditions were not sufficient to cause an exceedance under a normal emissions load (see Sonoma Technology, Inc., Appendix Y).

Airport observations confirm the carryover of wildfire-related emissions from the previous day, as well as the transport and build-up of wildfire emissions throughout the day on June 27 and their presence at ground level. During the early morning hours of June 27 (0300-0400 PST), visibilities were low throughout the northern portion of the Bay Area and the Sacramento Valley (refer to Figure 10). The low visibilities in the Folsom area, along with observations of smoke, confirm the high level of smoke carryover from the previous day. As time

progressed (0900-1000 PST), visibilities were reduced even further (3 to 5 miles in the northern Bay Area and 2.5 to 3 miles in the southern Sacramento Valley), as additional wildfire emissions were added to the carryover burden (refer to Figure 11). During this time, there were widespread reports of smoke and haze. As shown in Figure 12, the greatest wildfire impact in the southern Sacramento Valley occurred in the late afternoon, when visibility was only 2 to 2.5 miles at all three sites in the Folsom area. In addition, these three sites, as well as other surrounding sites, reported smoke at ground level, indicating that wildfire emissions reached the surface.

Fourth, ambient temperatures in the Sacramento area on June 27 were high enough to promote ozone formation from wildfire emissions. The maximum temperature at Folsom reached 99 degrees Fahrenheit. While this temperature is not unusual for the Folsom area, the amounts of available precursor emissions in the ground level air mass were unusual, and the added emissions burden from the wildfires was sufficient to push local ozone concentrations above the federal 1-hour standard. A comparison of maximum temperatures in the Sacramento region concluded that maximum temperatures on June 27 were similar to those on the surrogate day, when ozone concentrations were below the level of the standard. Hence, wildfire emissions were a critical factor in the June 27 exceedance.

In conclusion, the transport and build-up of wildfire-related emissions and their substantial contribution to the June 27 1-hour federal ozone exceedance at the Folsom monitoring site is supported by several factors, as summarized, below:

- 1) Wildfire emissions from the previous day resulted in a very high level of wildfire-related ozone carryover. The level of carryover was about one-third the level of the 1-hour standard, and it was nearly three times higher than what is typical for the Folsom site.
- 2) Overnight surface drainage winds transported additional wildfire emissions from both the Coast Range and Sierra Nevada mountains into the southern Sacramento Valley. These emissions were caught up in a localized eddy circulation pattern and added to the emissions burden on the June 27 exceedance day.
- 3) Daytime surface winds from the southwest occurred in combination with very low visibilities and observations of smoke in the northern Bay Area and southern Sacramento Valley. This combination of conditions and observations indicate a continuing increase in wildfire-related emissions from fires burning in the surrounding mountains.
- 4) The morning onshore pressure gradient, along with the local eddy circulation pattern, trapped emissions in the southern Sacramento Valley. Additionally, the pressure gradient between Reno and Sacramento helped keep emissions from moving out of the Valley.

- 5) The inversion present on June 27 trapped wildfire emissions close to the ground. However, based on the surrogate day assessment, the inversion was not sufficient or typical of the conditions associated with an exceedance under a normal emissions load.
- 6) Although the maximum June 27 temperature at Folsom was high, maximum temperatures in the Sacramento region were not high enough to generate an ozone exceedance based on a normal emissions load, as confirmed by the surrogate day assessment.

The conditions summarized above led to a build-up of wildfire-related emissions in the Folsom area that contributed significantly to ozone formation on June 27. The addition of wildfire-related emissions caused ozone concentrations to rise above levels typically measured at the Folsom site, resulting in a federal 1-hour ozone exceedance. The surrogate day assessment shows that the meteorological conditions present on June 27 would not be expected to result in an exceedance (refer to Sonoma Technology, Inc., Appendix Y). Therefore, the addition of the wildfire emissions was the primary cause of the exceedance on this day.

FIGURES AND TABLES FOR METEOROLOGICAL DISCUSSION EPISODE 2: JUNE 27, 2008

Figure 1
Map of Fires for June 20 through June 27, 2008

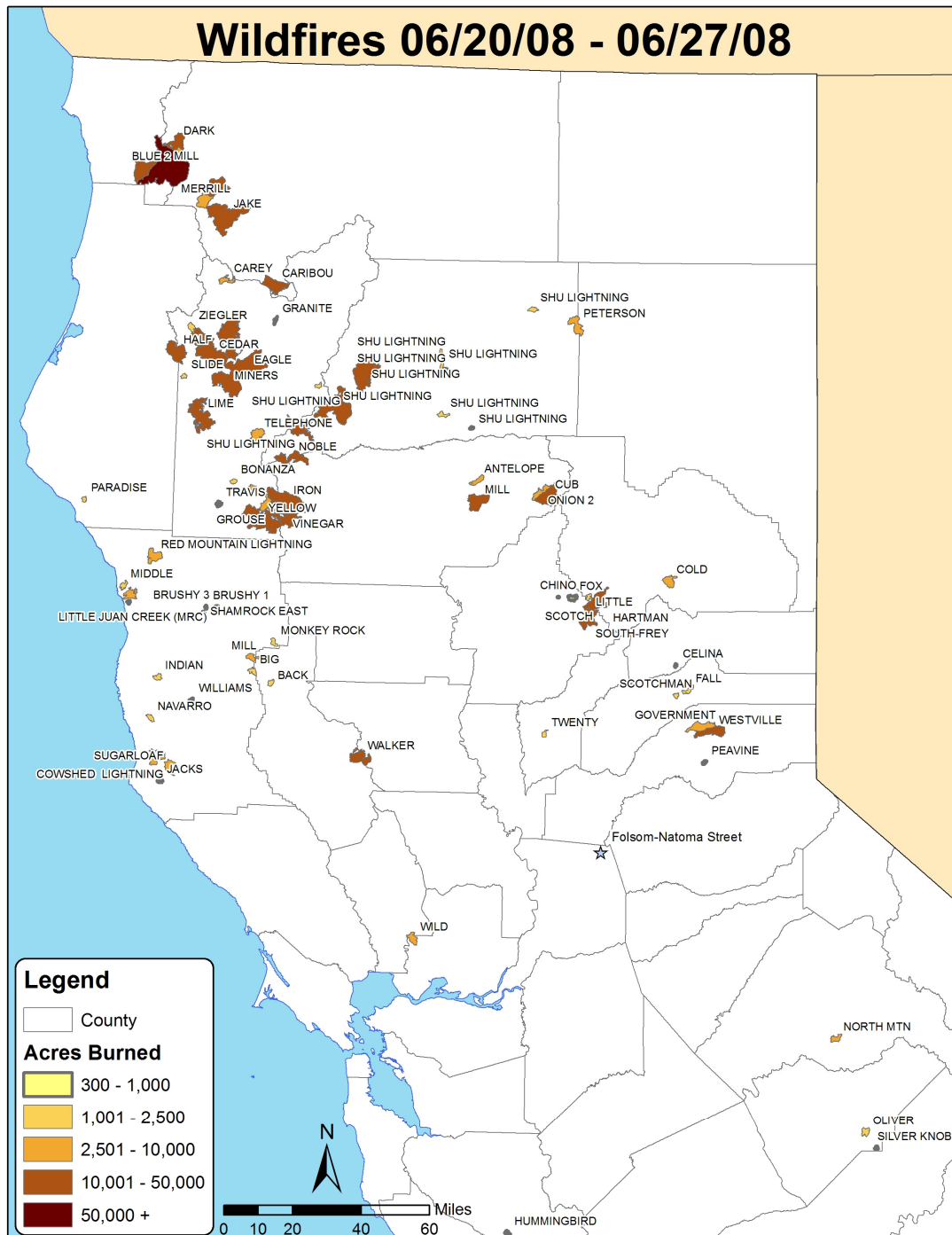


Table 1
List of Fires for June 20 through June 27, 2008

Fire Name	Alarm Date	Containment Date	Acreage	Incident Number	Fire Number	County Name	Distance from Folsom (miles)	Latitude	Longitude
RIVER 2	20080620	20080706	6	004608		Mendocino	108	39.032	-123.124
RUNNING SPRINGS	20080620	20080621	12	004608		Mendocino	124	39.222	-123.357
TRABING	20080620	20080622	594	005581		Santa Cruz	126	36.939	-121.818
SHU LIGHTNING	20080620		388	004727		Shasta	130	40.474	-121.910
JACKS	20080620	20080712	729	004608		Mendocino	130	38.939	-123.561
SAN JUAN GRADE	20080620	20080620	22	002358		Monterey	131	36.811	-121.581
TWO ROCK	20080620	20080621	4	004602		Mendocino	131	39.368	-123.449
SHU LIGHTNING	20080620		249	004727		Shasta	134	40.539	-121.892
SHU LIGHTNING	20080620		2054	004727		Shasta	136	40.528	-122.070
SHAMROCK	20080620	20080625	52	004608		Mendocino	138	39.680	-123.407
TABLE MTN	20080620	20080626	146	004608		Mendocino	142	39.230	-123.707
ARCHER	20080620	20080709	8	004608		Mendocino	142	39.849	-123.360
ALBION RIVER	20080620	20080621	2	004607		Mendocino	143	39.239	-123.724
RED HILL	20080620	20080715	42	004608		Mendocino	143	39.940	-123.302
SHU LIGHTNING	20080620		263	004727		Shasta	145	40.472	-122.573
BURNS FLAT	20080620	20080630	29	004608		Mendocino	147	39.769	-123.529
SHU LIGHTNING	20080620		564	004727		Shasta	148	40.717	-122.065
SHU LIGHTNING	20080620		1193	004727		Shasta	150	40.735	-122.083
SHU LIGHTNING	20080620		35312	004727		Shasta	151	40.546	-122.662
SHU LIGHTNING	20080620		12977	004727		Shasta	152	40.453	-122.845
4 MILE	20080620	20080719	6	004608		Mendocino	153	39.651	-123.729
SHU LIGHTNING	20080620		1148	004727		Shasta	154	40.788	-122.091
LINCOLN	20080620	20080622	20	004597		Mendocino	154	39.703	-123.713
SHU LIGHTNING	20080620		30	004727		Shasta	155	40.844	-121.973
SHU LIGHTNING	20080620		1045	004727		Trinity	156	40.487	-122.922

Table 1 (continued)
List of Fires for June 20 through June 27, 2008

Fire Name	Alarm Date	Containment Date	Acreage	Incident Number	Fire Number	County Name	Distance from Folsom (miles)	Latitude	Longitude
SHU LIGHTNING	20080620		28330	004727		Shasta	157	40.698	-122.511
TELEPHONE	20080620	20080813	6911		00000115	Trinity	158	40.421	-123.096
SHU LIGHTNING	20080620		1310	004727		Trinity	160	40.637	-122.764
SHU LIGHTNING	20080620		1911	004727		Shasta	160	40.982	-121.581
LIME	20080620	20080813	24885		00000137	Trinity	173	40.496	-123.411
BEAR WALLOW	20080620	20080713	39		00000140	Trinity	174	40.514	-123.407
INDIAN VALLEY	20080620	20080703	182		00000144	Trinity	175	40.519	-123.416
DEEP #1	20080620	20080705	30		00000145	Trinity	176	40.561	-123.387
MADDOX LAKE #3	20080620	20080813	23		00000143	Trinity	176	40.547	-123.425
HITCHCOCK	20080620	20080813	53		00000111	Trinity	177	40.534	-123.459
GRASSY CREEK	20080620	20080624	18		00000148	Trinity	178	40.615	-123.369
BOTTOM	20080620	20080621	20		00000057	Trinity	179	40.682	-123.293
LARABEE 3	20080620	20080621	29	003405		Humboldt	186	40.387	-123.879
HIGH	20080620	20080622	29	003395		Humboldt	188	40.364	-123.945
IRONSIDE	20080620	20080731	12834		00000164	Trinity	190	40.821	-123.424
HALF	20080620	20080825	15130		00000035	Humboldt	192	40.762	-123.559
REDCREST 2	20080620	20080621	30	003396		Humboldt	192	40.413	-123.990
MILL	20080620	20081003	65882		00000023	Siskiyou	237	41.542	-123.651
THREE	20080620	20080723	4923		00000010	Siskiyou	238	41.600	-123.573
BOTTLE	20080621	20080622	19		00000038	El Dorado	26	38.954	-120.823
FORESTHILL	20080621	20080625	55	013273		Placer	31	39.020	-120.780
SOLDIER	20080621	20080624	30		00000037	El Dorado	34	38.778	-120.552
TWENTY	20080621	20080625	1355	013264		Yuba	38	39.181	-121.481
CAPPS	20080621	20080622	19		00000027	El Dorado	39	38.652	-120.442
PEAVINE	20080621	20080706	581		00000040	Placer	40	39.067	-120.610

Table 1 (continued)
List of Fires for June 20 through June 27, 2008

Fire Name	Alarm Date	Containment Date	Acreage	Incident Number	Fire Number	County Name	Distance from Folsom (miles)	Latitude	Longitude
GOVERNMENT	20080621	20080801	9220		00000037	Placer	47	39.219	-120.629
WESTVILLE	20080621	20080801	11090		00000041	Placer	48	39.198	-120.570
SCOTCHMAN	20080621	20080703	1165		00000025	Nevada	51	39.350	-120.766
FALL	20080621	20080715	2417		00000033	Nevada	54	39.375	-120.699
FORBESTOWN	20080621	20080624	26		00000058	Yuba	58	39.527	-121.225
CELINA	20080621	20080702	309		00000032	Sierra	59	39.479	-120.770
25 FIRE	20080621	20080626	168		00000031	Sierra	59	39.529	-121.002
WILD	20080621	20080627	4102	004790		Solano	60	38.303	-122.171
BROWN	20080621	20080831	29		00000061	Butte	66	39.637	-121.145
SOUTH-FREY	20080621	20080831	12402		00000052	Butte	69	39.673	-121.250
HARTMAN	20080621	20080831	331		00000068	Plumas	72	39.731	-121.155
WARNERVILLE	20080621	20080621	59	005699		Stanislaus	73	37.716	-120.625
SCOTCH	20080621	20080831	13008		00000063	Plumas	74	39.749	-121.206
FOUR MILE	20080621		789	000539		Butte	74	39.741	-121.342
HUNGARY	20080621	20080831	20		00000050	Butte	76	39.763	-121.437
RODY	20080621	20080831	19		00000054	Butte	77	39.798	-121.323
COLD	20080621	20080831	5599		00000070	Plumas	82	39.835	-120.807
BIG	20080621	20080704	74		00000027	Plumas	84	39.891	-121.302
SLATE	20080621	20080804	10		00000031	Plumas	86	39.918	-121.001
NORTH MTN	20080621	20080719	2964		00000013	Tuolumne	88	37.899	-119.897
CREST	20080621	20080704	39		00000038	Plumas	89	39.977	-121.258
OLD TOLL	20080621	20080623	78	007976		Mariposa	99	37.510	-120.116
KEDDIE	20080621	20080625	78		00000073	Plumas	104	40.167	-120.896
CUB	20080621	20080721	14729		00000013	Tehama	105	40.189	-121.480
ONION 2	20080621	20080722	4905		00000015	Tehama	107	40.208	-121.522

Table 1 (continued)
List of Fires for June 20 through June 27, 2008

Fire Name	Alarm Date	Containment Date	Acreage	Incident Number	Fire Number	County Name	Distance from Folsom (miles)	Latitude	Longitude
BACK	20080621	20080629	1566		00000019	Lake	108	39.370	-122.976
HWY 140	20080621	20080623	1566	007972		Mariposa	108	37.336	-120.146
MILL	20080621	20080629	13512	004261	00000079	Tehama	109	40.162	-121.868
OLIVER	20080621	20080714	2806		00000014	Mariposa	113	37.499	-119.740
INDIAN PEAK	20080621	20080623	49	007986		Mariposa	113	37.405	-119.863
MONKEY ROCK	20080621	20080714	1886		00000016	Mendocino	113	39.542	-122.967
BIG	20080621	20080705	2193		00000012	Mendocino	114	39.417	-123.077
ANTELOPE	20080621	20080629	3417	004308		Tehama	115	40.251	-121.871
HUMMINGBIRD	20080621	20080624	786	003094		Santa Clara	115	37.060	-121.635
MILL	20080621	20080726	3042		00000041	Mendocino	117	39.476	-123.085
SILVER KNOB	20080621	20080626	570		00000011	Mariposa	118	37.429	-119.683
STAR	20080621	20080714	235		00000018	Madera	118	37.523	-119.561
WESTFALL	20080621	20080714	102		00000019	Mariposa	119	37.444	-119.658
WHITE HURST	20080621	20080623	256	003091		Santa Clara	120	36.996	-121.693
ROAD 600	20080621	20080622	2	007985		Madera	121	37.313	-119.794
RIDEOUT	20080621	20080708	26	004732		Mendocino	122	39.285	-123.299
FOLSOM	20080621	20080708	91	004656		Mendocino	124	39.511	-123.213
5-12 WHIPPLE LIGHTNING	20080621	20080630	12	004658		Mendocino	125	39.087	-123.434
OSO	20080621	20080712	228	004673		Mendocino	126	39.131	-123.444
WILLIAMS	20080621	20080627	445	004682		Mendocino	127	39.288	-123.406
SUGARLOAF	20080621	20080709	6928	004696		Mendocino	128	38.998	-123.506
BRUSHY 8	20080621	20080710	97	004688		Mendocino	128	39.630	-123.225
CHIQUITO	20080621	20080717	145		00000017	Madera	129	37.414	-119.429
BRUSHY 7	20080621	20080625	141	004689		Mendocino	129	39.660	-123.215
BRUSHY 6	20080621	20080710	31	004706		Mendocino	130	39.652	-123.245

Table 1 (continued)
List of Fires for June 20 through June 27, 2008

Fire Name	Alarm Date	Containment Date	Acreage	Incident Number	Fire Number	County Name	Distance from Folsom (miles)	Latitude	Longitude
BRUSHY 5	20080621	20080625	92	005151		Mendocino	130	39.640	-123.264
SLIDES	20080621	20080627	1641		00000022	Tehama	131	40.064	-122.858
BRUSHY 3	20080621	20080712	327	004669		Mendocino	133	39.686	-123.286
COWSHED LIGHTNING	20080621	20080715	4466	004655		Mendocino	134	39.031	-123.611
JOHNSON	20080621	20080625	52		00000039	Trinity	135	40.022	-123.000
SHAMROCK EAST	20080621	20080712	481	004691		Mendocino	135	39.655	-123.361
BRUSHY 1	20080621	20080626	391	004639		Mendocino	136	39.683	-123.345
NORTHFORK CAMP	20080621	20080706	9	004704		Mendocino	136	39.313	-123.570
GILEAD	20080621	20080626	30		00000038	Trinity	137	40.022	-123.044
NAVARRO	20080621	20080626	1853	004657		Mendocino	137	39.204	-123.625
IRON	20080621	20080823	30660		00000118	Tehama	138	40.140	-122.923
YELLOW	20080621	20081120	31933		00000047	Trinity	139	40.062	-123.056
SHAMROCK WEST	20080621	20080712	46	004699		Mendocino	139	39.669	-123.430
BULL	20080621	20080627	40		00000040	Trinity	140	40.006	-123.150
GROUSE	20080621	20080705	6324		00000033	Trinity	141	40.127	-123.030
5-10 CAVANAUGH LIGHTNING	20080621	20080709	24	004652		Mendocino	141	39.154	-123.726
CAMP	20080621	20080630	231		00000035	Trinity	143	40.077	-123.144
LOST CREEK	20080621	20080630	31		00000062	Trinity	144	40.099	-123.156
WATERSPOUT #1	20080621	20080710	61		00000066	Trinity	145	40.114	-123.147
SPRING	20080621	20080710	10		00000075	Trinity	145	40.116	-123.152
CREEK	20080621	20080710	30		00000084	Trinity	145	40.116	-123.156
NOBLE	20080621	20080708	12985		00000119	Shasta	146	40.325	-122.902
TROUGH #1	20080621	20080813	3689		00000120	Trinity	147	40.185	-123.119
NIELSON	20080621	20080714	86		00000031	Trinity	148	40.015	-123.340
SWIM	20080621	20080630	185		00000058	Trinity	149	40.166	-123.181

Table 1 (continued)
List of Fires for June 20 through June 27, 2008

Fire Name	Alarm Date	Containment Date	Acreage	Incident Number	Fire Number	County Name	Distance from Folsom (miles)	Latitude	Longitude
TRAVIS	20080621	20080626	958		00000054	Trinity	151	40.122	-123.294
BONANZA	20080621	20080705	1371		00000059	Trinity	153	40.220	-123.217
VAN HORN	20080621	20080623	68		00000029	Trinity	153	40.204	-123.236
BIERCE	20080621	20080622	18		00000134	Trinity	153	40.250	-123.203
LONG	20080621	20080626	11		00000037	Trinity	154	40.124	-123.354
FUELS	20080621	20080621	9		00000034	Trinity	154	40.178	-123.298
PETERSON	20080621	20080701	8022		00000046	Shasta	155	40.917	-121.338
SOUTH FORK	20080621	20080626	83		00000123	Trinity	156	40.370	-123.107
RED MOUNTAIN LIGHTNING	20080621	20080801	7513	004695		Mendocino	156	39.892	-123.640
HARDY CREEK LIGHTNING	20080621	20080711	5354	004973		Mendocino	157	39.726	-123.760
PAINTERS	20080621	20080622	15			Lassen	159	40.824	-120.078
CHINA	20080621	20080623	35		00000159	Trinity	162	40.514	-123.070
LASSIC	20080621	20080621	23		00000028	Trinity	169	40.345	-123.498
BASIN COMPLEX	20080621	20080727	163607		00000016	Monterey	170	36.256	-121.642
FISHER	20080621	20080705	35		00000153	Trinity	170	40.449	-123.395
LOGWOOD	20080621	20080727	20		00000017	Monterey	172	36.231	-121.697
MINERS	20080621	20081031	24876		00000106	Trinity	175	40.637	-123.268
EAGLE	20080621	20081004	32024		00000066	Trinity	176	40.714	-123.163
BOULDER	20080621	20080622	33		00000113	Trinity	176	40.518	-123.464
STUARTS	20080621	20080630	224		00000095	Trinity	181	40.911	-122.971
GRANITE	20080621	20080914	552		00000180	Trinity	182	40.909	-123.015
PARADISE	20080621	20080801	1072	003423		Humboldt	183	40.120	-124.035
CEDAR	20080621	20080731	25392		00000079	Trinity	184	40.749	-123.361
SLIDE	20080621	20080708	1182		00000184	Trinity	185	40.659	-123.512
BUCKHORN	20080621	20080731	29814		00000188	Trinity	186	40.836	-123.263

Table 1 (continued)
List of Fires for June 20 through June 27, 2008

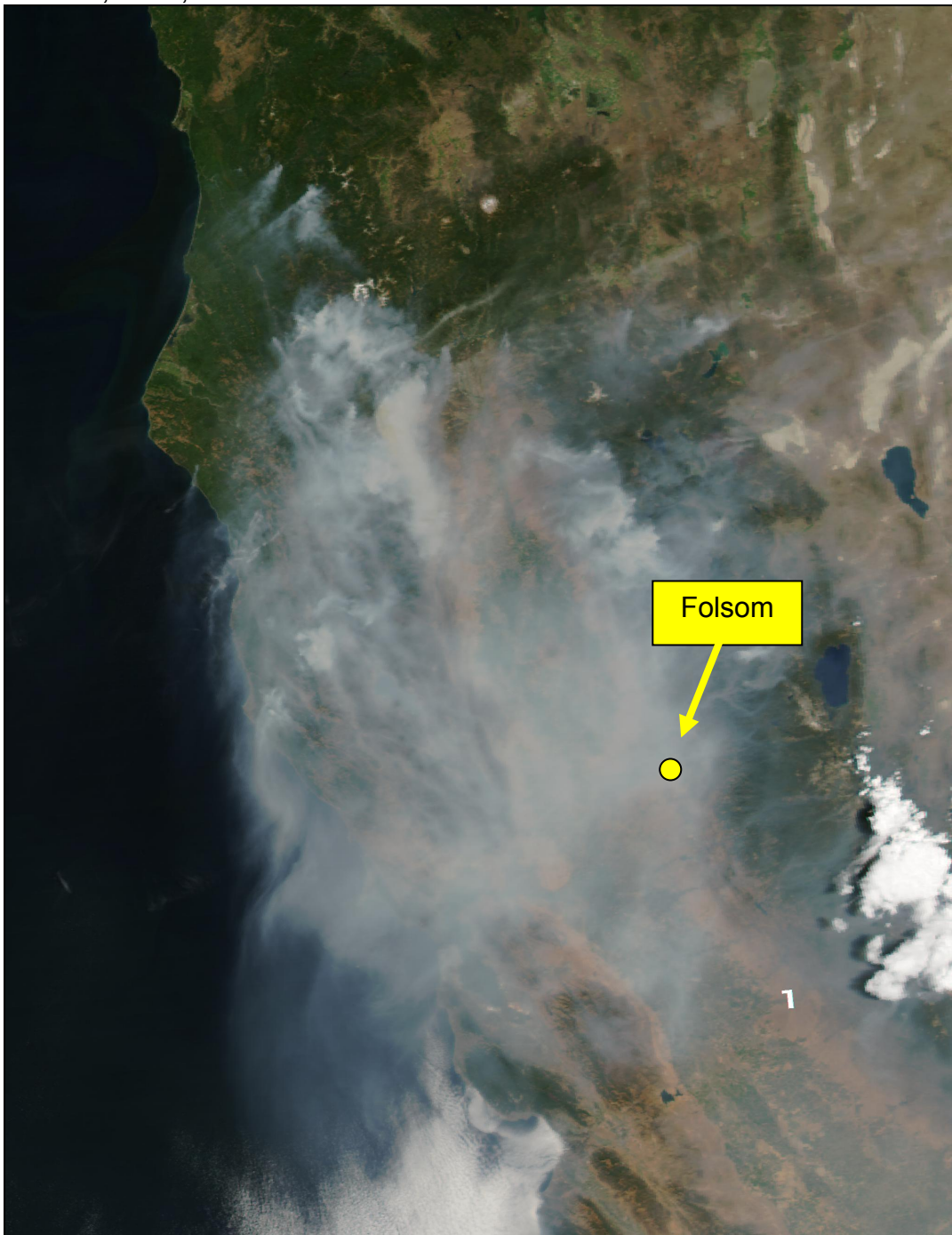
Fire Name	Alarm Date	Containment Date	Acreage	Incident Number	Fire Number	County Name	Distance from Folsom (miles)	Latitude	Longitude
BENNETT	20080621	20080622	31		00000114	Humboldt	186	40.655	-123.557
CARSON	20080621	20080704	65	003450		Humboldt	189	40.429	-123.893
SARGEANTS	20080621	20080621	20	002373		Monterey	191	35.936	-120.757
CARIBOU	20080621	20081216	13127		00000026	Siskiyou	191	41.059	-123.025
DENNY	20080621	20080625	43		00000176	Trinity	194	40.923	-123.378
ZIEGLER	20080621	20080731	2349		00000069	Trinity	195	40.868	-123.480
CAREY	20080621	20080731	3714		00000175	Trinity	200	41.073	-123.294
GOULD	20080621	20080702	229		00000015	Siskiyou	200	41.199	-123.042
PACKSADDLE	20080621	20080624	35		00000039	Humboldt	212	41.168	-123.520
CRAPO	20080621	20080731	15		00000016	Siskiyou	214	41.349	-123.220
JAKE	20080621	20081003	38417		00000041	Siskiyou	216	41.347	-123.310
MERRILL	20080621	20081003	8339		00000068	Siskiyou	223	41.408	-123.437
HAYPRESS	20080621	20081003	13665		00000049	Siskiyou	225	41.469	-123.362
BLUE 2	20080621	20081003	17552		00000026	Del Norte	241	41.537	-123.785
DARK	20080621	20080723	10390		00000011	Siskiyou	242	41.651	-123.602
RAVINE	20080622	20080623	23	013351		Placer	14	38.891	-121.173
LITTLE	20080622	20080831	1399		00000043	Plumas	75	39.765	-121.248
FOX	20080622	20080831	1870		00000045	Butte	75	39.761	-121.339
WALKER	20080622	20080705	11173	004843		Colusa	75	39.065	-122.480
CHINO	20080622	20080831	159		00000049	Butte	76	39.763	-121.417
ROCK2	20080622	20080831	24		00000044	Butte	76	39.780	-121.290
QUARRY	20080622	20080622	211	005708		San Mateo	97	37.681	-122.415
BEACH FIRE	20080622	20080622	7	081477		Marin	101	38.231	-122.946
CLIFF RIDGE	20080622	20080712	4658	004752		Mendocino	132	39.051	-123.569
THOMES	20080622	20080630	980		00000029	Tehama	132	40.035	-122.918

Table 1 (continued)
List of Fires for June 20 through June 27, 2008

Fire Name	Alarm Date	Containment Date	Acreage	Incident Number	Fire Number	County Name	Distance from Folsom (miles)	Latitude	Longitude
HARVEY	20080622	20080701	949		00000031	Tehama	133	40.092	-122.854
VINEGAR	20080622	20080625	14544		00000030	Tehama	134	40.076	-122.923
BROWN	20080622	20080625	3787	002390		San Benito	139	36.687	-120.920
CORRAL FIRE	20080623	20080721	12434	002759		Lassen	151	40.863	-120.861
MURPHY	20080623	20080630	51		00000049	Shasta	156	40.819	-122.120
MIDDLE	20080623	20080715	2067	004807		Mendocino	160	39.762	-123.800
BOSWELL	20080625	20080915	60	000044	00000044	Tehama	132	40.053	-122.895
1-6 SKUNK 2 LIGHTNING	20080625	20080704	2	005131		Mendocino	138	39.751	-123.341
CUTTHROAT	20080625	20080625	84		00000052	Trinity	178	40.758	-123.157
1-11 RAY SPRINGS LIGHTNING	20080626	20080705	0	005224		Mendocino	136	39.888	-123.182
INDIAN	20080626	20080712	2096	004884		Mendocino	139	39.378	-123.593
LEONARD LAKE	20080627	20080704	0	005262		Mendocino	124	39.260	-123.347
LITTLE JUAN CREEK (MRC)	20080627	20080715	327	004941		Mendocino	156	39.693	-123.768

Figure 2
Visible Satellite Image

June 26, 2008, 1346 PST



NASA Visible Aqua MODIS Bands 1, 4, and 3 True Color Satellite Image
(250 meter resolution)

http://activefiremaps.fs.fed.us/data/imagery/2008178/ca-north-000/crefl2_A2008178214602-2008178215301_250m_ca-north-000_143.jpg

Visibility and Present Weather June 26, 2008 0300-0400 PST

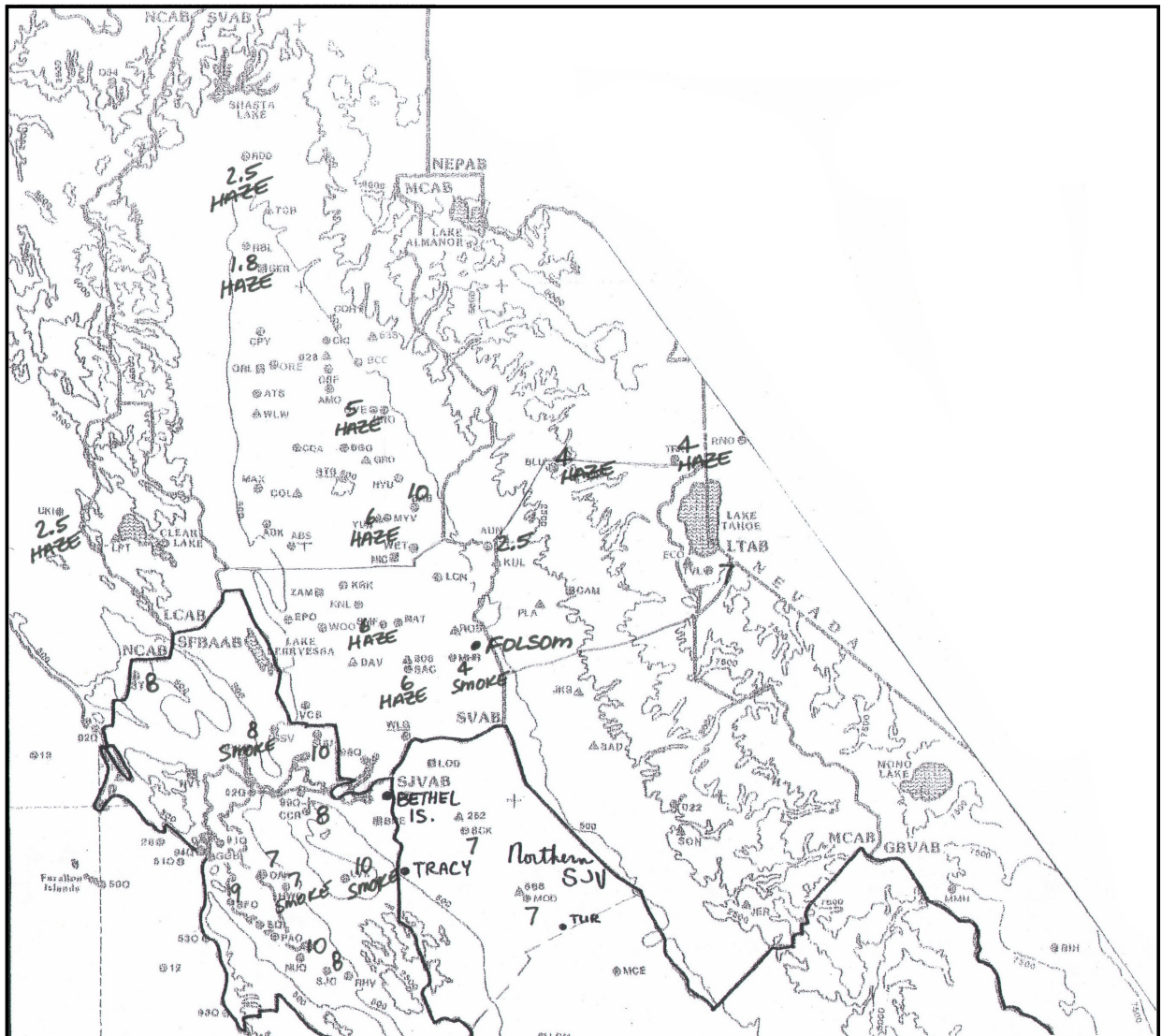


Figure 4
Visibility and Present Weather June 26, 2008 0900-1000 PST

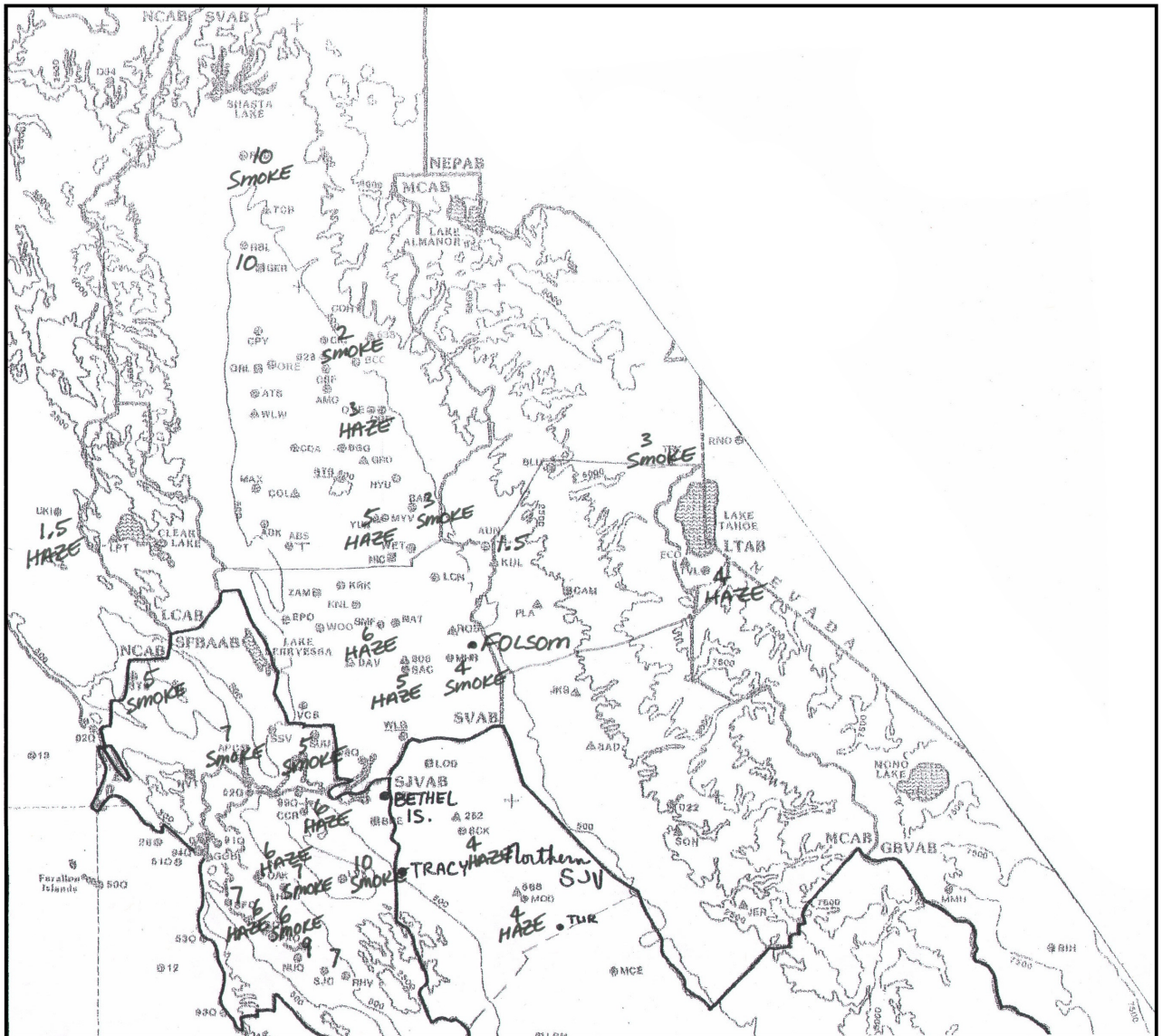
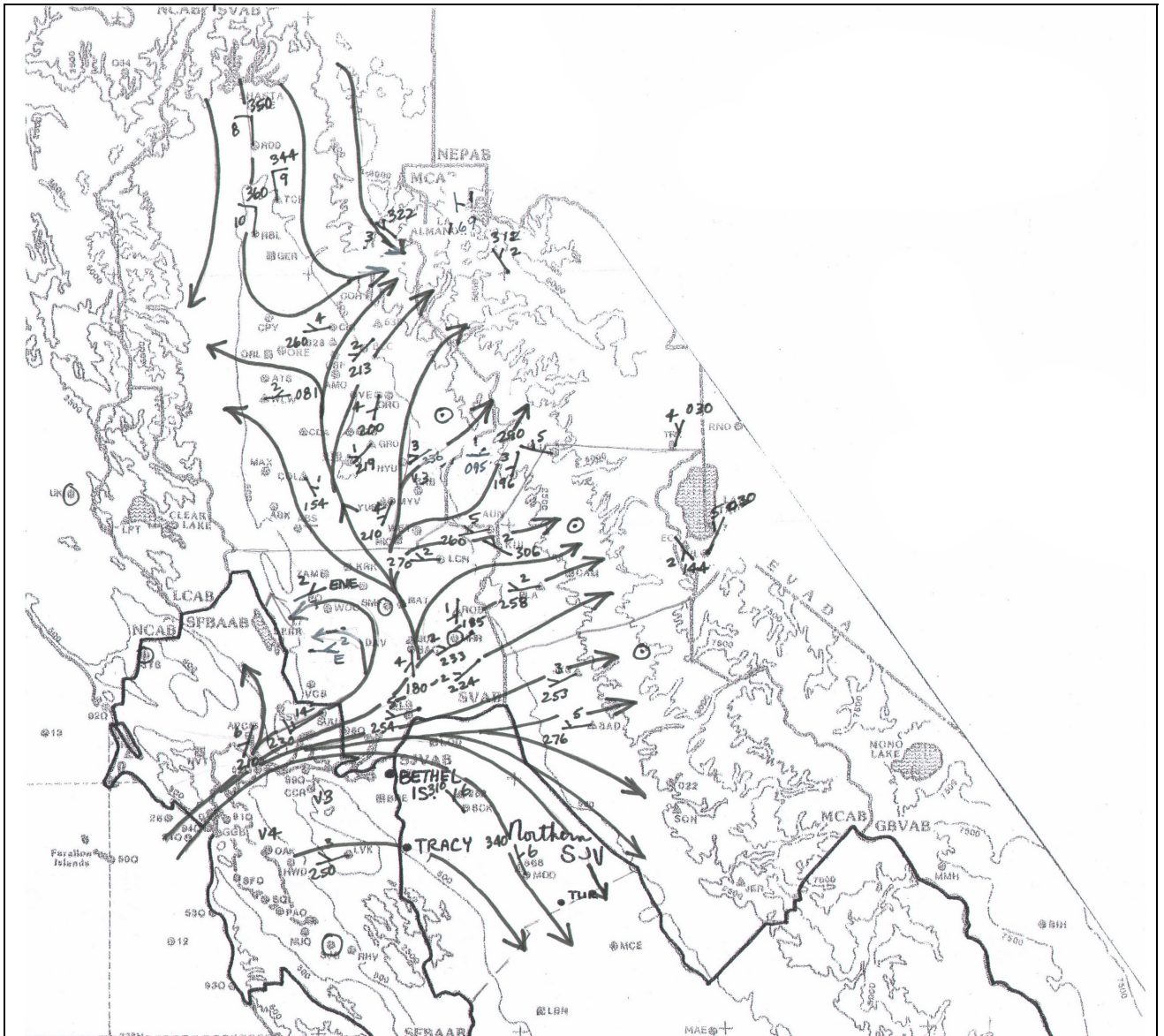


Figure 6
Surface Winds June 26, 2008, 0900-1000 PST



Surface Winds June 26, 2008, 1500-1600 PST

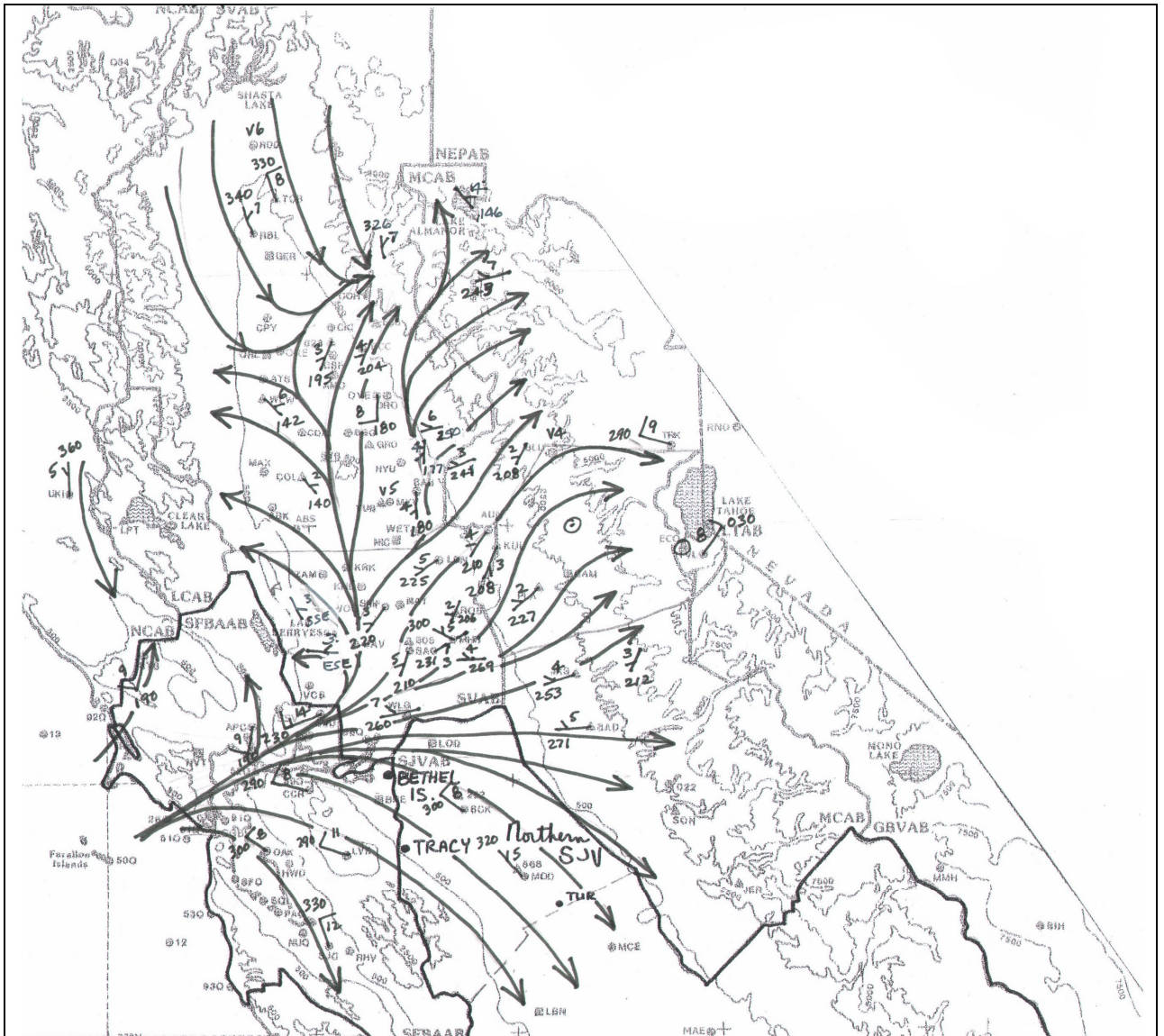


Figure 8

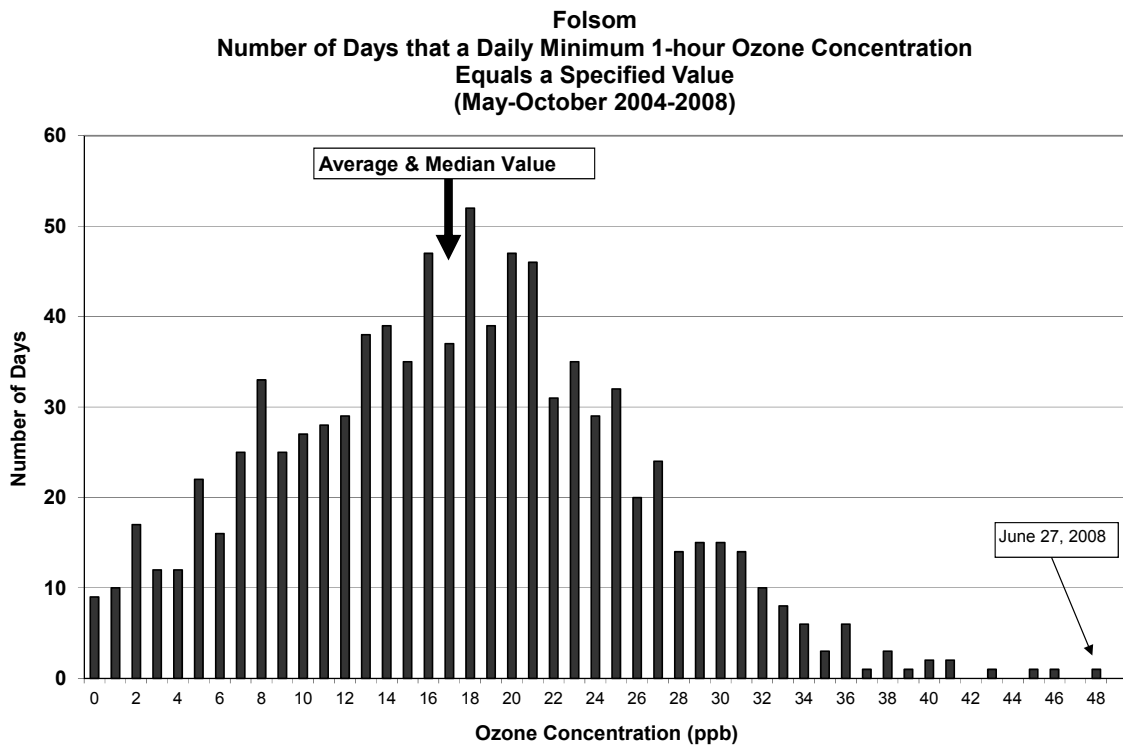


Table 2
Paradise-Airport and Cool Hourly Winds June 26-27, 2008

Date	Start Time (PST)	Paradise-Airport		Cool-Highway 193	
		Wind Speed (miles/hour)	Wind Direction (degrees)	Wind Speed (miles/hour)	Wind Direction (degrees)
20080626	0:00	3.5	313	3.5	50
	1:00	5.8	7	3.5	56
	2:00	6.9	12	2.3	59
	3:00	3.5	17	3.5	43
	4:00	1.2	352	3.5	45
	5:00	1.2	13	2.3	31
	6:00	0	189	2.3	38
	7:00	0	266	3.5	22
	8:00	2.3	248	2.3	21
	9:00	2.3	213	3.5	306
	10:00	3.5	213	3.5	252
	11:00	3.5	206	3.5	220
	12:00	3.5	214	3.5	246
	13:00	3.5	212	4.6	220
	14:00	3.5	215	6.9	202
	15:00	4.6	204	3.5	208
	16:00	3.5	213	3.5	221
	17:00	3.5	214	3.5	205
	18:00	3.5	216	2.3	173
	19:00	2.3	211	1.2	50
	20:00	2.3	81	2.3	46
	21:00	2.3	66	2.3	56
	22:00	4.6	45	2.3	52
	23:00	5.8	25	2.3	38
20080627	0:00	3.5	351	2.3	43
	1:00	2.3	342	3.5	49
	2:00	2.3	27	3.5	44
	3:00	1.2	244	3.5	51
	4:00	2.3	301	3.5	52
	5:00	1.2	233	3.5	50
	6:00	1.2	278	2.3	46
	7:00	1.2	329	3.5	28
	8:00	1.2	248	1.2	11
	9:00	2.3	222	0	219
	10:00	3.5	220	3.5	190
	11:00	3.5	210	4.6	209
	12:00	3.5	210	4.6	203

Table 2 (continued)
Paradise-Airport and Cool Hourly Winds June 26-27, 2008

Date	Start Time (PST)	Paradise-Airport		Cool-Highway 193	
		Wind Speed (miles/hour)	Wind Direction (degrees)	Wind Speed (miles/hour)	Wind Direction (degrees)
20080627 (continued)	13:00	3.5	218	5.8	208
	14:00	3.5	216	5.8	194
	15:00	4.6	218	5.8	195
	16:00	4.6	215	4.6	195
	17:00	3.5	214	3.5	230
	18:00	2.3	212	2.3	211
	19:00	1.2	167	0	176
	20:00	1.2	108	2.3	41
	21:00	2.3	60	3.5	100
	22:00	2.3	56	3.5	93
	23:00	4.6	43	3.5	115

Table 3
Thomes Creek (33 miles SW of Red Bluff)
Hourly Winds June 26-27, 2008

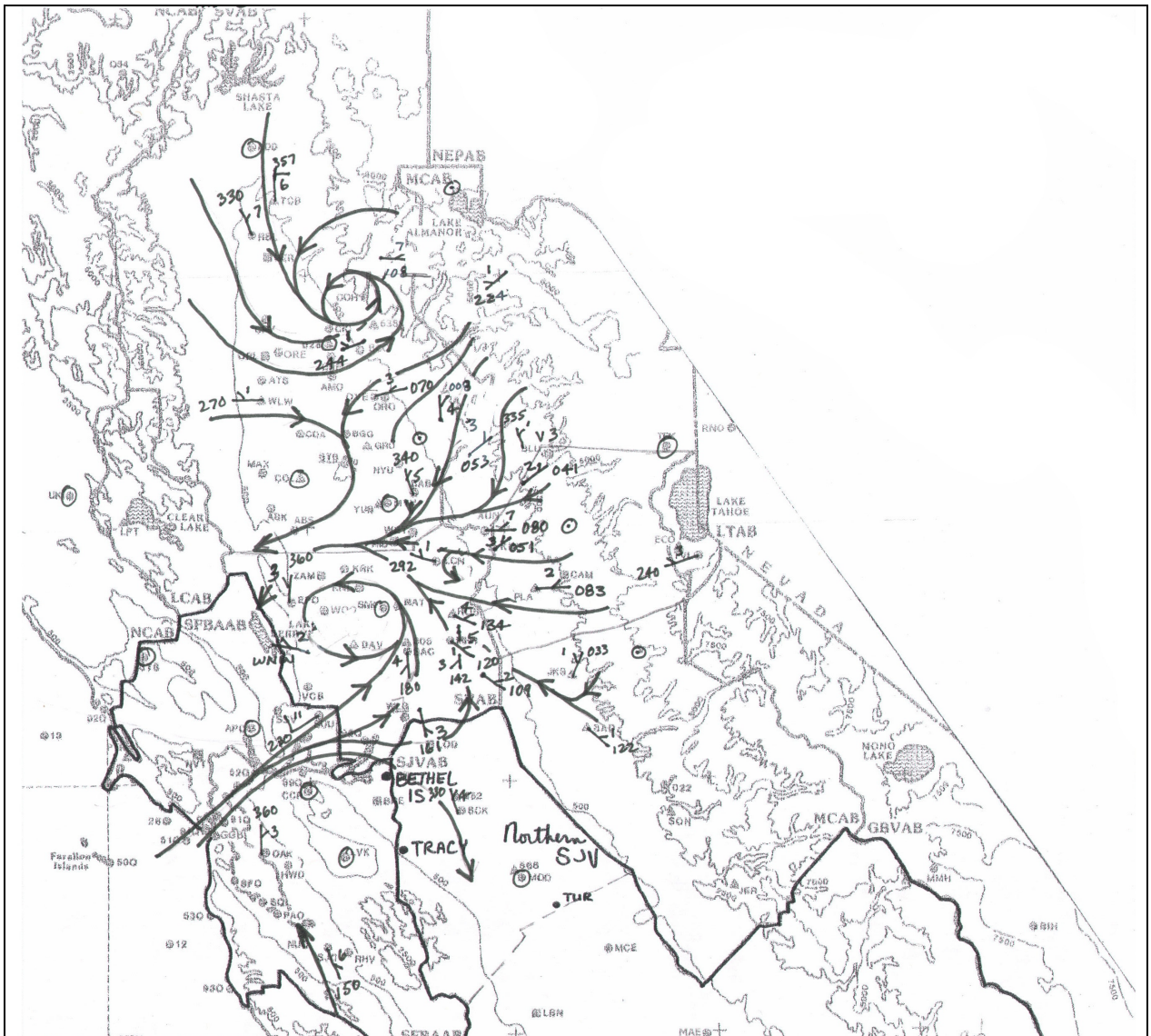
Date	Hour (PST)	Wind Speed (mph)	Wind Direction
20080626	0:51	10	WSW
	1:51	8	WSW
	2:51	9	WSW
	3:51	7	WSW
	4:51	9	SW
	5:51	10	WSW
	6:51	8	WSW
	7:51	9	WSW
	8:51	3	WNW
	9:51	7	NNW
	10:51	7	N
	11:51	8	WNW
	12:51	9	NNW
	13:51	5	NNE
	14:51	4	NNW
	15:51	10	N
	16:51	6	NNW
	17:51	5	NW
	18:51	7	WSW
	19:51	10	SW
	20:51	10	WSW
	21:51	11	WSW
	22:51	6	W
	23:51	13	W
20080627	0:51	10	W
	1:51	13	W
	2:51	12	WSW
	3:51	12	WSW
	4:51	14	WSW
	5:51	10	WSW
	6:51	8	WSW
	7:51	7	W
	8:51	1	W
	9:51	4	NNE
	10:51	4	NE
	11:51	2	E

Table 3
Thomes Creek (33 miles SW of Red Bluff)
Hourly Winds June 26-27, 2008

Date	Hour (PST)	Wind Speed (mph)	Wind Direction
20080627	12:51	4	SE
	13:51	5	ESE
	14:51	3	NNE
	15:51	10	ESE
	16:51	11	ESE
	17:51	8	ESE
	18:51	7	ESE
	19:51	3	ESE
	20:51	5	SW
	21:51	2	S
	22:51	5	WNW
	23:51	2	WNW

LATITUDE: 39.8542
LONGITUDE: -22.61
ELEVATION: 1029ft
MNET: RAW5

Surface Winds June 27, 2008, 0300-0400 PST



Visibility and Present Weather June 27, 2008 0300-0400 PST

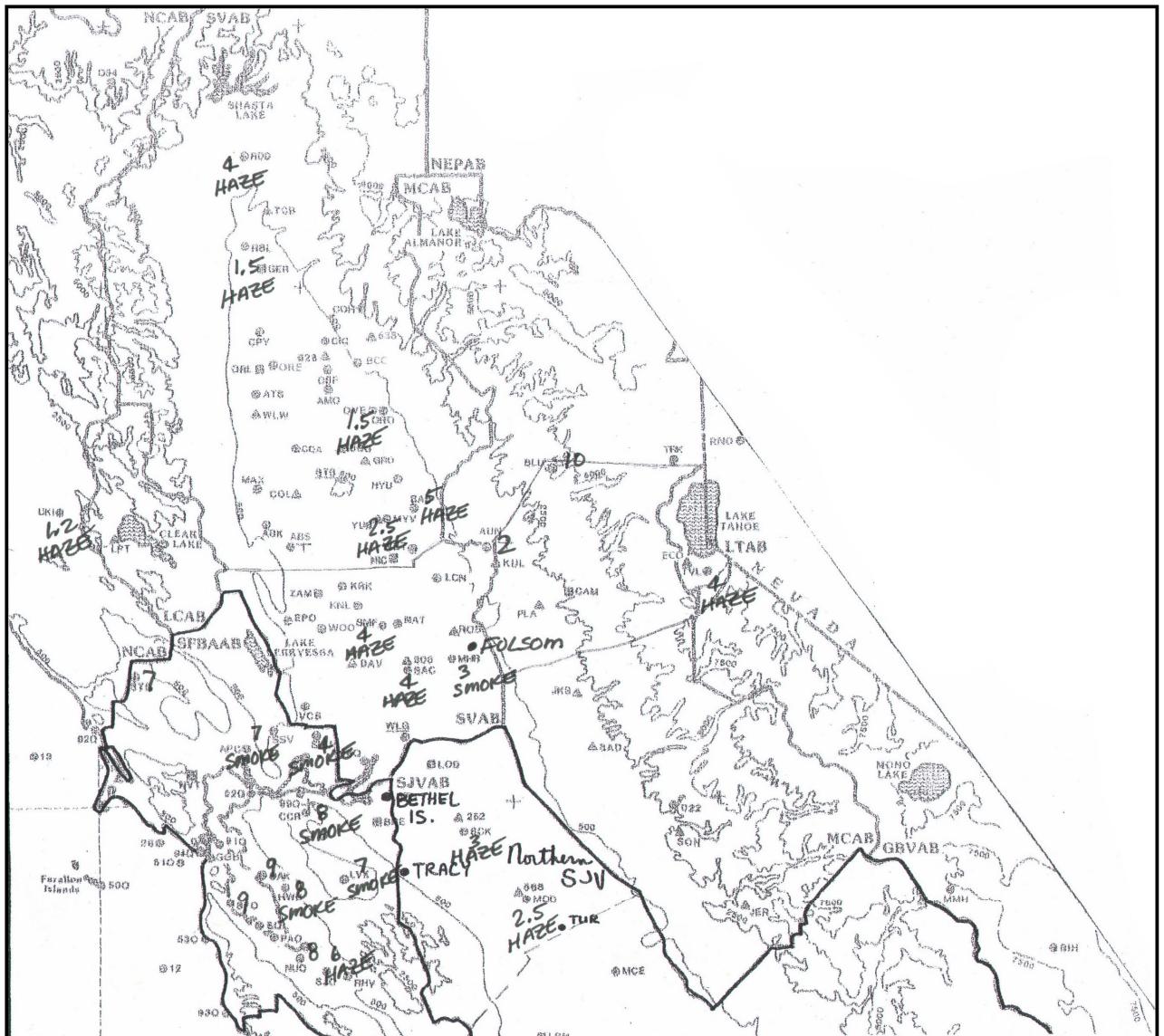
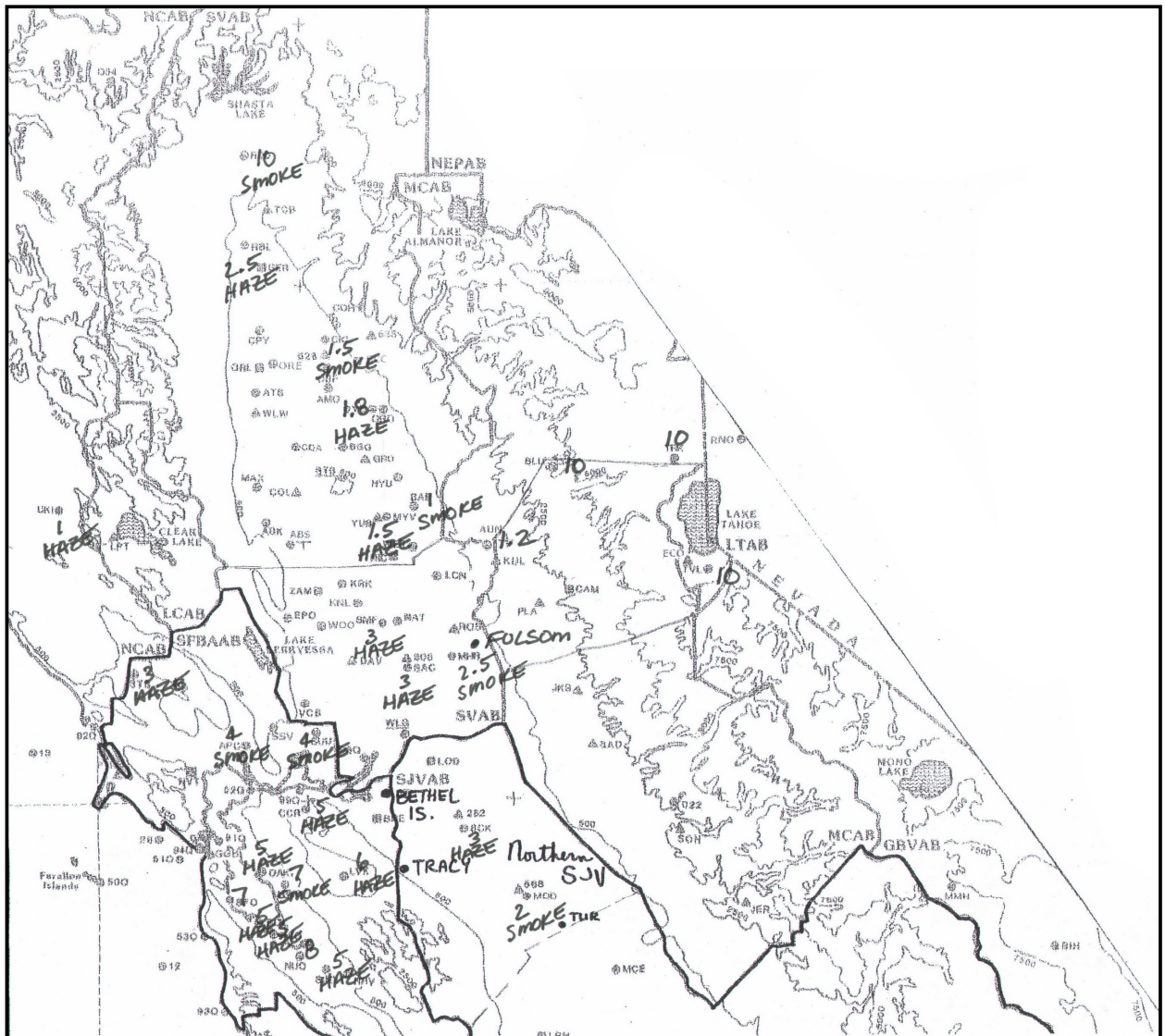


Figure 11
Visibility and Present Weather June 27, 2008 0900-1000 PST



Visibility and Present Weather June 27, 2008 1500-1600 PST

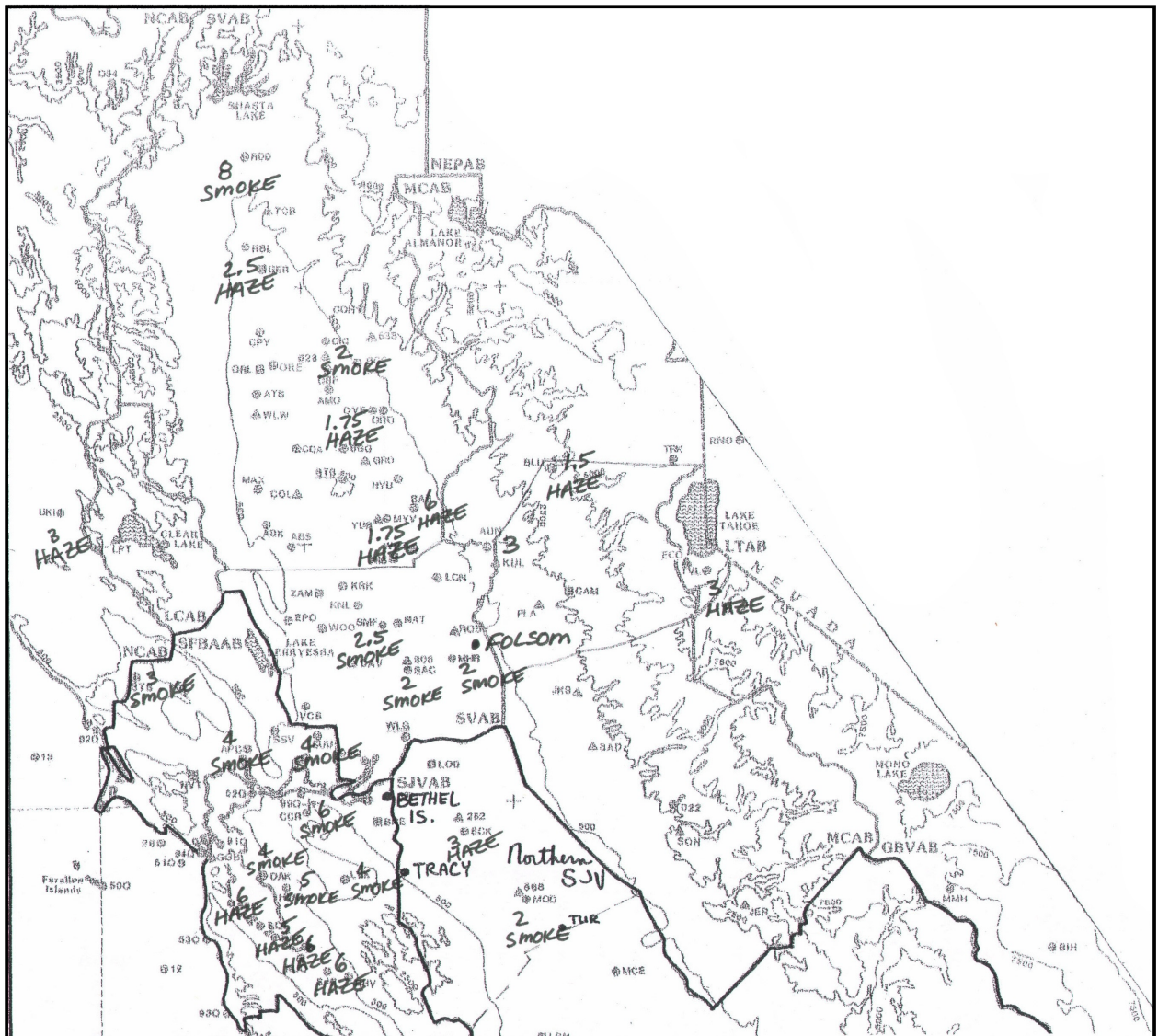
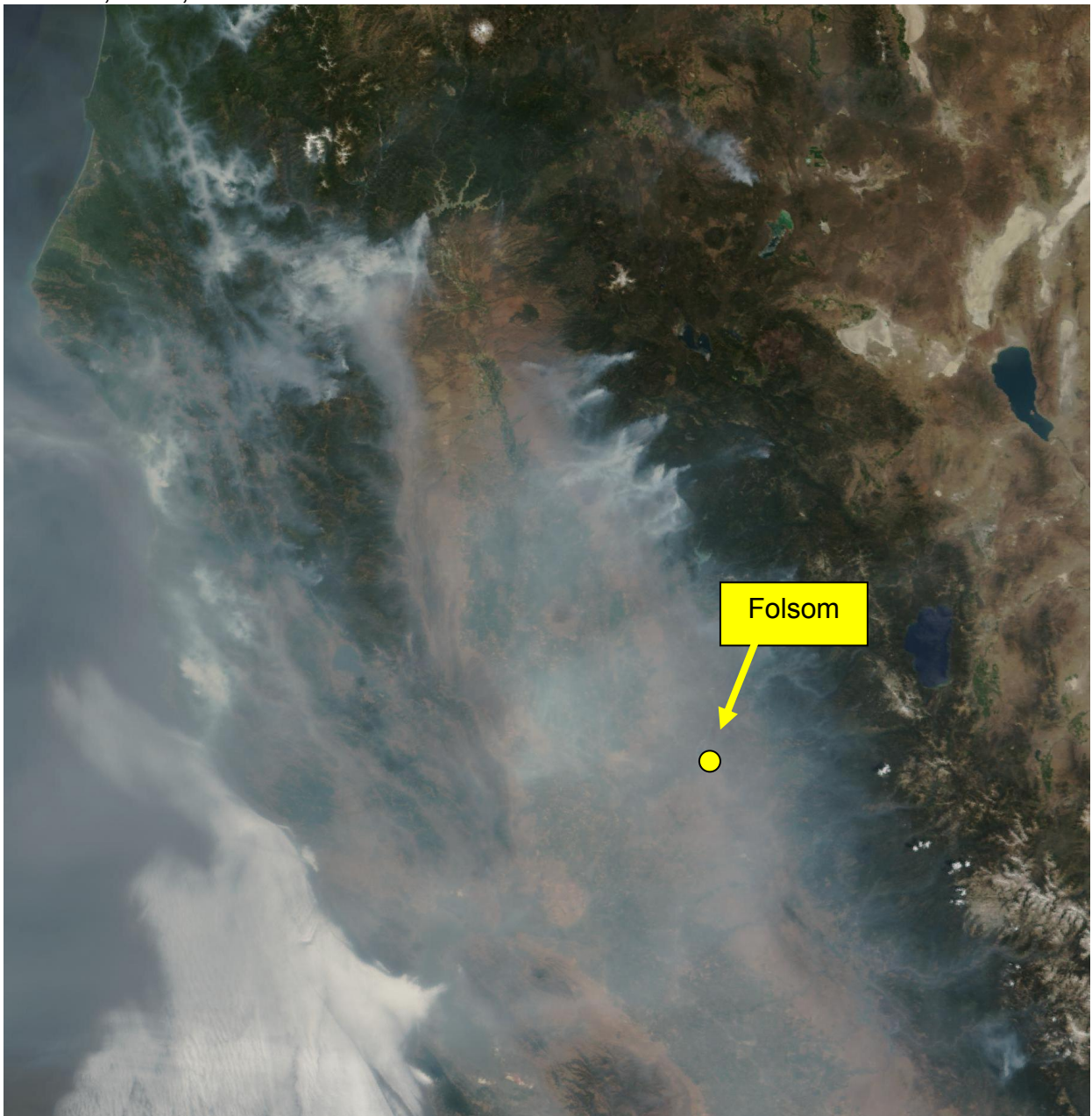


Figure 13
Visible Satellite Images

June 27, 2008, 1109 PST

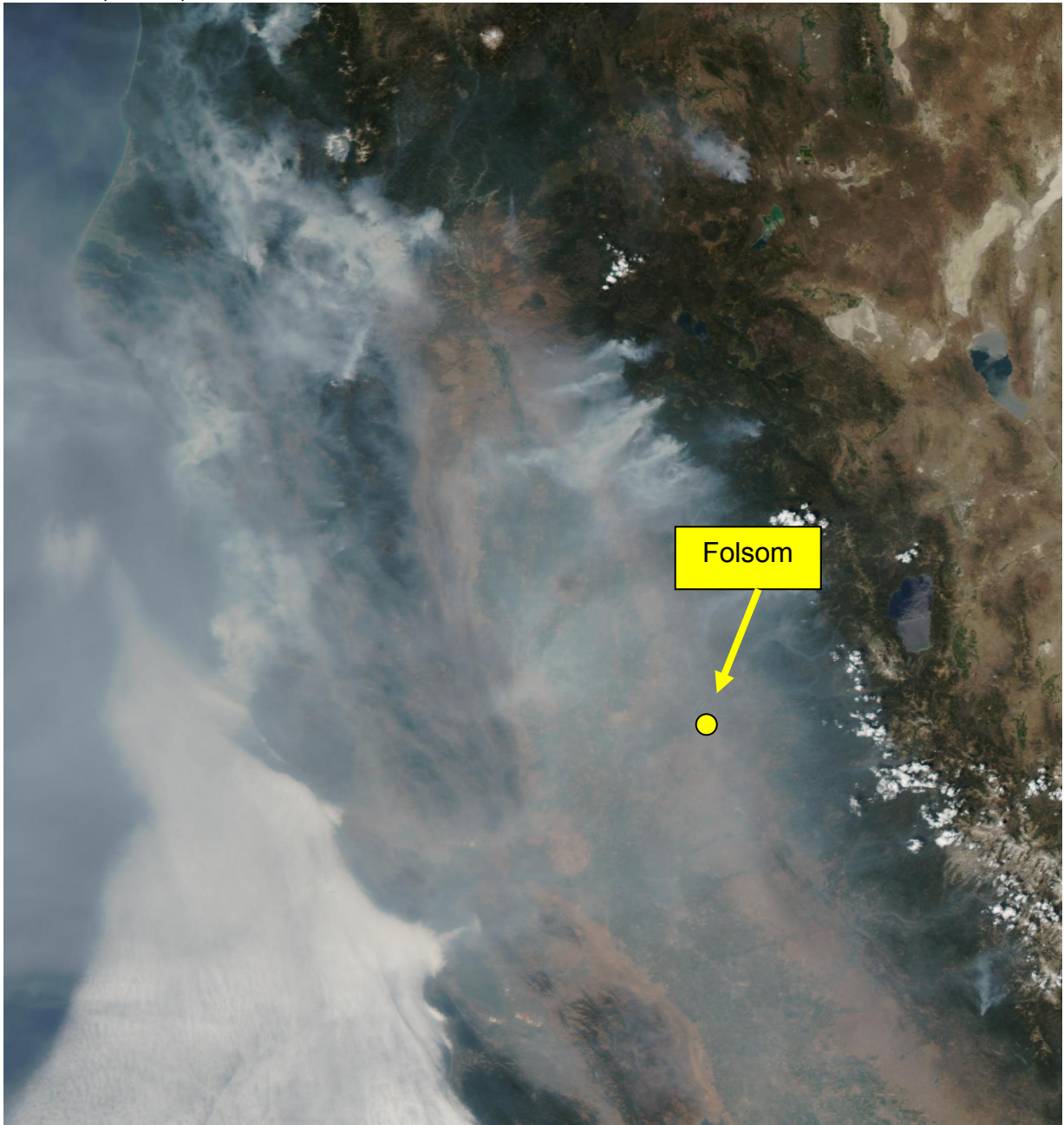


NASA Visible Terra MODIS Bands 1, 4, and 3 True Color Satellite Image (250 meter resolution)

http://activefiremaps.fs.fed.us/data/imagery/2008179/ca-north-000/crefl1_A2008179190901-2008179192011_250m_ca-north-000_143.jpg

Figure 14
Visible Satellite Images

June 27, 2008, 1249 PST



NASA Visible Aqua MODIS Bands 1, 4, and 3 True Color Satellite Image (250 meter resolution)

http://activefiremaps.fs.fed.us/data/imagery/2008179/ca-north-000/crefl2_A2008179204921-2008179205828_250m_ca-north-000_143.jpg

Figure 15
Change in Height of Mixing Layer at Elk Grove on June 27, 2008

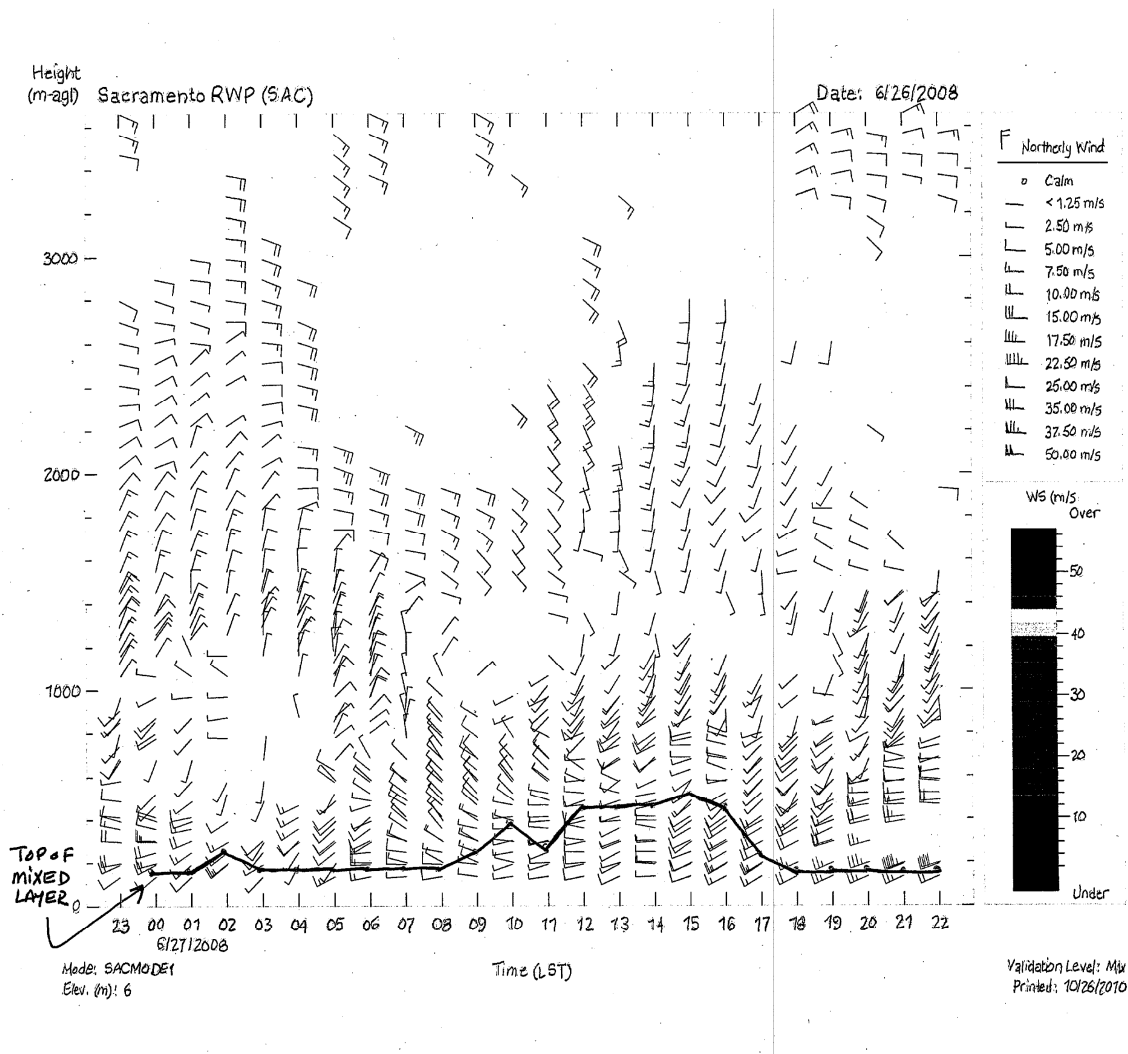


Figure 16
Surface Winds June 27, 2008, 0900-1000 PST



